**INTRODUCTION**

The Mechanisms of Addiction Treatment and Ecological Observations (MATEO) laboratory is primarily concerned with the etiology and treatment of risky/addictive behaviors. This overarching goal is well-served through the prudent use of ecological momentary assessment (EMA) methods. EMA uses mobile technology to assess moods, thoughts, and behaviors in real-time. EMA has several advantages over more traditional assessment techniques, of which we highlight two. 1) Collection of data in real-time can minimize the effects of recall biases, which have been shown to be prominent in the assessment of alcohol use (Ekhholm, 2004; Gmel & Daeppon, 2007). 2) EMA data can be used to more richly understand within-subject processes (e.g., treatment engagement resulting in a change in a primary mechanism of behavior change, resulting in a change in alcohol-related outcomes). In this poster, we present data from two EMA studies, a daily diary study, and one weekly diary study. Using multi-level modeling, we aim to demonstrate that there is substantial within-subject variability in a range of alcohol-related outcomes that is typically ignored in favor of between-subject analyses.

**METHOD**

- Each sample consists of college students
- EMA Sample 1 was recruited from an email to undergraduates at a university in the Midwest; all other samples were recruited from a psychology department participant pool at a university in the Southeast
- EMA Sample 1: 74 drinkers
  - inclusion criteria: must have reported drinking at least ‘2 - 4 times per month’ based on the Alcohol Use Disorders Identification Test
  - 21-day EMA study
  - 1575 total days reported, 454 planned drinking days
- EMA Sample 2: 134 drinkers
  - inclusion criteria: must have reported binge drinking (5/4 of more standard drinks in an occasion for men/women) at least twice in the past 30 days
  - 4-week EMA study
  - 3655 total days, 731 drinking days
- Daily Diary Sample: 83 drinkers
  - inclusion criteria: must have reported at least 1 alcohol-related problem in the past 90 days
  - 2-week daily diary
  - 1012 total days reported, 286 drinking days
- Weekly Diary Sample: 334 drinkers
  - inclusion criteria: must have reported binge drinking (5/4 criterion) at least twice in the past 30 days
  - 4-8 week diary study
  - 668 total weeks reported

**RESULTS**

- Using Mplus 7 (Muthén & Muthén, 1998-2013), we conducted intercept-only multilevel models (i.e., hierarchical linear modeling) with each alcohol-related outcome in each dataset in a separate model
- These models allowed a simple decomposition of the total variance in each outcome into between-subject [intraclass correlation coefficient (ICC)] and within-subject variance (1 – ICC)
- The tables and figures below summarize this decomposition

<table>
<thead>
<tr>
<th>Sample</th>
<th>Alcohol Use</th>
<th>Consequences</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Between</td>
<td>Within</td>
</tr>
<tr>
<td>EMA 1</td>
<td>.145</td>
<td>.855</td>
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<tr>
<td>EMA 2</td>
<td>.145</td>
<td>.855</td>
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<tr>
<td>Daily Diary</td>
<td>.115</td>
<td>.885</td>
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<td>Weekly Diary</td>
<td>.555</td>
<td>.445</td>
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</tbody>
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**SUMMARY**

- A simple decomposition of variance in alcohol-related outcomes from daily diary and EMA studies demonstrates that there is more within-subject variability (ranging from 85.5% to 88.5% of variance in alcohol use; ranging from 52.3% to 82.7% in alcohol-related consequences) than between-subject variability (ranging from 11.5% to 14.5% in alcohol use; ranging from 17.3% to 47.7% variance in alcohol-related consequences) for each alcohol outcome
- In comparison, the weekly diary design showed much less within-subject variability, demonstrating that aggregating over just one week loses substantial within-subject variability
- These results suggest that aggregating alcohol use behaviors and consequences over time (e.g., over 90 day periods) results in a loss of substantial, meaningful variability that can be captured with more event-level designs
- Across the datasets reported here and others, we have found important predictors of within-subject variability in alcohol-related outcomes including mood and drinking motives (EMA Sample 1: Dvorak, Pearson, & Day, 2014; Daily Diary: Pearson, Bravo, & Henson, in progress), protective behavioral strategies (Daily Diary Samples: Pearson, D’Lima, & Kelley, 2014a, 2014b), drinking context (Pearson et al., 2014), etc.
- We argue that the vast majority of alcohol research examining mediation or mechanisms of behavior change (MOBC) would benefit from the use of EMA designs
- Most importantly, causal relationships are much more likely to occur on short timescales (e.g., a moment of high stress leads to near immediate increases in craving, which in turn leads to drinking that night) than long timescales (e.g., high levels of stress leads to increases in craving 3 months later, which in turn leads to drinking 3 months later)
- Ongoing and upcoming studies in the MATEO lab demonstrate the range of opportunities provided by EMA designs:
  - Predictors and consequences of unintended drinking (ABMRF Grant 1)
  - How affective dynamics (e.g., affect instability) relate to alcohol outcomes (ABMRF grant 2)
  - Effects of brief mindfulness practice on affective dynamics and substance use
  - How mobile-delivered cognitive retraining changes alcohol outcomes among hazardous drinkers (K01023233)
  - How mobile-delivered protective behavioral strategies intervention changes alcohol outcomes among college students (R01-pending)

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